

## **Negotiating environmental crisis? Rural-urban interface perspective on the forest ecosystem restoration project in West Java and Lombok, Indonesia**

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Forest ecosystem restoration (FER) projects have been encouraged as part of mitigating the environmental crisis. Applying rural-urban interface perspective, this paper views ecosystem restoration as a process of transferring the environmental burden from urban areas to the farmers who live in the upstream of watersheds. Ecosystem restoration is a techno-science effort to change the degraded landscape to overcome environmental problems. To some extent, the implementation of restoration has changed land use practices that influence the livelihoods of farmers at the upstream areas. Changes in land use created by FER project are the crisis which the farmers should deal with.

Our qualitative research in West Java and Lombok shows how discourse on the relation between degraded upstream watershed ecosystems and the environmental crisis in the downstream area is powerful in mobilizing fundings, scientific research, technology, and practices to change the landscape of upstream rural areas which are dominated by agricultural activities. FER is also an arena for negotiating differences in interpreting the natural crisis defined by urban communities in the downstream and the farmers in the upstream rural. In the case of West Java and Lombok, the potential natural disasters or the scarcity of clean water to urban residents, and the limitations of farmers to access their lands are two narratives of the crisis that must be overcome through FER. The agroforestry promoted by restoration experts, governments, donors, project implementers and farmers, is an assemblage considered capable in mitigating the environmental crisis in downstream urban while advancing the economic interests of farmers in the upstream rural area.

Keywords: *forest ecosystem restoration (FER), environmental crisis, agroforestry, Indonesia*

### **I. Background**

Since its emergence in the 70s, 'ecosystem restoration' or 'ecological restoration' has expanded as the scientific concept referring to the use of ecological knowledge to rehabilitate a degraded ecosystem (Martin, 2017). The social aspect of ecosystem restoration appeared in the 80s which brings ecosystem restoration become a pivotal topic in social-environmental studies. Higgs (2003) considers ecosystem restoration as a project that builds imagination about future natural conditions and landscapes, or a 'nature by design'. This notion invites for the assessment of cultural issues on the ecosystem restoration project.

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In Indonesia ecosystem restoration has been adopted into some nature conservation initiatives. In some locations, forest ecosystem restoration (FER) in specific takes complicated socio-economic and political problem, especially related to the interests and values of the local community. FER has been emerged not only in the domain of scientists, but also environmental activists and business entities. Indonesian government has issued permits for ecosystem restoration through forest concession schemes, such as those held by PT. REKI in Jambi (Buergin, 2016).

FER is a set of practices associated with reproduction of space, landscape or environment that is not only physical but also social. The study of social aspects in FER would be relevant to the recent global issues to mitigate climate change, one of which is due to the forest degradation. Studies on ecosystem restoration show that there is a trade-off between creating a technical landscape and the interests of the communities surrounding the restoration site.

Negotiating 'environmental crisis' is a narrative describing the process of linkage and contradiction between the meaning of 'crisis' from the farmer's point of view and the ecosystem restoration experts. By restoration experts, crises are defined through ecological measurements indicating the degradation of forest values and functions which create potential factors toward environmental crises. Meanwhile, for farmers, restoration means reforesting their agricultural land that has contributed to their livelihood.

This paper reviews ecosystem restoration project as an effort to restore degraded ecosystem conditions by coalescing the science and technology-based practices with social-economy approach. Projects in West Java and Lombok of West Nusa Tenggara were implemented in the upstream catchment areas which aimed to avoid environmental crisis and risks faced by urban areas downstream, such as floods, landslides, and scarcity of water. Using the rural-urban interface perspective, we view the rehabilitated ecosystem as a unified natural, socio-economic, and political process of creating new landscape. Combining the rural-urban interface perspective with political ecology demonstrates the environmental crises in urban areas also determine the relationship between farmers in upstream villages and forests or agricultural land.

## **II. Method**

The discussion in this paper is based on ethnographic data conducted in two locations, the Puncak area in West Java and Central Lombok in West Nusa Tenggara province. These two locations are State Forest that are biophysically defined functioning as water-catchment area and buffer zone for residents of Jakarta and its surroundings, as well as the city of Mataram in Lombok.

The study conducted at the project site of Gaia Eko Daya Buana (Gaia), an environmental consulting company based in Jakarta. The data collected is not limited on the social economy aspects of local farmers, but also how Gaia and other actors outside the community create discourses about environmental crisis and the approach they used to support the restoration goals. Considering the ecosystem restoration as the creation process of imagined new landscape, we take

into account the historical relationship between farmers and their forest land is critical point in negotiating the ‘crisis’.

### **III. Findings and discussion**

#### ***1. Defining environmental crisis***

The location of the FER project by Gaia is a state forest located in the upstream area of the watershed. In Puncak, FER was carried out in forest under concession of PT. Perhutani (state-owned corporate), which is next to the privately-owned tea plantation and national nature reserves. This location is the ‘zero’ point of the Ciliwung river stream, located at the altitude of 1250 – 1650 masl. Perhutani has managed production forest and planted pine trees for some decades. Meanwhile, the tea plantations and Telaga Warna Nature Reserve has established since the Dutch colonial era. Local farmers have legal access to cultivate land within the state forest through the Social Forestry program in partnership with Perhutani.

Some studies indicate the changes in land use in upstream of Ciliwung contribute to the floods that frequently hit Jakarta megacity. Puncak area also has been rapidly developed as a tourism destination visited by residents of Jakarta and its surrounding cities.

The FER project in Central Lombok is about 35 Km from Mataram city, capital of NTB Province, at downstream with good condition of access road. South from the FER site is the Mandalika Exclusive Economic Zone (EEZ), which is recently famous with the MotoGP international event.

In 2001 some international agencies (USAID, UNDP, Ford Foundation) allocated financial and technical support to develop Payments for Environmental Services (PES) aimed at ‘reforesting’ the Mount Rinjani hills and adapting local practices at upstream of Lombok (FAO, 2013). KOICA, development funding agency from South Korea, promoted REDD+ scheme as strategy of FER. In 2016-2017, Gaia and some local NGOs supported by MCA-I donor initiate FER project using the narrative of watercatchment protection and mitigation of climate change.

#### ***2. The restoration farmers and experts***

We use ‘restoration farmers’ as a group of local farmers engaged by Gaia and other agencies in ecosystem restoration project. They manage land within state forest which have been appointed as the forest restoration site. In Puncak, West Java, there were around 64 farmers involved in FER project, while in Lombok there were about 400 farmers coming from five villages. They, both in Puncak and Lombok, are also the members of farmers group who hold legal permit of forest use under the Social Forestry Program (Perhutsos).

FER by Gaia has not solely changing the forest landscape in the upstream areas, but also to the land and forest use by farmers as well. The effectiveness of restoration activities in reducing

flood cases and sustaining the water springs for downstream areas might need to be evaluated based on various environmental parameters. However, the facts of changes in the economic activities of the population that are correlated with the forest are a situation that is currently happening.

Restoration farmers in Puncak and Lombok are those who before ecosystem restoration had controlled and cultivated land in forest areas with short-term crops. Farmers in Puncak have grown various types of vegetables and coffee, while others illegally plant sengon (*Albizia chinensis*).

In Lombok, restoration farmers are members of HKm farmer groups who hold permit to use protected forests since 2000. Since the 90s they have cultivated these lands for staple and cash crops, such as paddy, vegetables, beans, maize, and bananas. Cultivation of such plant species is criticized by forest experts as not support the ecological function of the forest.

As a business entity, Gaia provides environmental social studies services related to the sustainable management of the environment and natural resources. In FER projects, Gaia applies the 'participatory ecosystem restoration', a concept of restoration that combines scientific approach and the local communities's needs.

Gaia usually run FER by a team of ecologists, biologists and anthropologists who assess the bio-physical and socioeconomic features of the targetted restoration sites. Their studies are the for the designing the restoration plans as well as strategies for community engagement. It is through the work of experts the existing landscape is visualized, problems are identified, and a new landscape is envisaged. Knowledge produced by exerts further implemented by a field team who closely work with local communities, particularly restoration farmers.

### ***3. Negotiating the environmental crisis***

FER project by Gaia aims on translating the ecological technical knowledge into the social-economy values. Agreement obtained by Gaia, local government, and farmers on multi-purpose trees species (MPTS), incl. forest trees and fruits, derived from series of negotiations during project planning and implementation. Further, our study identifies the agreement on MPTS represents the nexus of differentiate perceptions of the crisis and risks subsequent from landscape change by FER project.

Gaia's experts, local government, and environmental organizations foster agroforestry which is considered as appropriate strategy from the scientific and technical perspective. Planting the MPTS might restore forest function in providing ecosystem services for community, especially people in the downstream area. However, from farmers' standpoint, planting MPTS risks to the economic loss. In Lombok, agroforestry means throwing off collective memory of farmers to the earlier period of struggling to gain access to forest. From 90's they encroached primary state forest

to be the subsistence agriculture lands by growing paddy, vegetables, or other cash crops. In 2000 they were finally granted legal permits to controlled lands in state forest.

Restoration farmers have a different image of the new landscape. Agroforestry on their productive land does not mean merely to restore the forest like before they cultivated. Moreover, there are risks they have to deal with during the transitional phase between the loss of crops for quick cash, and the MPTS harvest period in the next 5-10 years. Their ecological knowledge and agronomy taking role in imagining what the crisis is. To manage the meaning of 'crisis' calculated by farmers, Gaia run supporting project to add values of existing commodities, such as coffee and brown sugar production. In one village, Gaia incorporated agroforestry with carbon trading scheme to stimulate farmers to increase forest cover.

#### **IV. Conclusion**

FER is mainly triggered by environmental crisis due to ecosystem degradation. However, in the context of FER sites that have been managed by the community, scientific and social approaches would not ensure the restoration goals achieved. The negotiation process is pivotal to bring together ecological and social values within various contexts. Agroforestry might be effective to restore ecological value while still create benefits to farmers. However, the planted tree species could further be understood as the result of the negotiated meaning of 'crisis' among actors. In our case, the negotiation process enables the transfer of environmental risks, which supposed to be the burden for urban people in downstream area, to the farmers in upstream who have to transform their relationship with forest land, to switch their livelihood from staple and cash crops to agroforestry.